Groundwater Monitoring Report No. 15
(Third Annual Sampling Event)

for the

Sheridan Disposal Services Superfund Site
Operable Unit 2
Waller County, Texas

Prepared by

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Section 1

1.0 INTRODUCTION

1.1 Purpose and Objectives

This Annual Groundwater Monitoring Report for the Sheridan Disposal Services Superfund Site Ground Water Migration Management Operable Unit 2 (OU2) has been prepared on behalf of the Sheridan Site Trust (SST) in accordance with the Record of Decision (ROD) signed September 22, 1989, the Statement of Work (SOW), the Ground Water Consent Decree (CD), except as modified by later agreement between SST and the U.S. Environmental Protection Agency (EPA), and the Ground Water Migration Management Workplan approved July 18, 2006 and revised November 14, 2007.

The purpose of this report is to report the data collected on June 11, 2014 during the annual groundwater monitoring event and summarize all the data collected to date.

1.2 Site Location and Description

The Sheridan Disposal Services (SDS) Superfund Site is located in northern Waller County, Texas, approximately 9 miles north-northwest of the City of Hempstead, Texas and 2 miles northwest of the intersection of Clark Bottom Road and Farm Road 1736. The property is bounded on the east, south and west sides by farm and ranch lands and on the north by the Brazos River. The site lies within the Gulf Coastal Plain Physiographic Province and is transitionally positioned between the Post Oak Savannah and Blackland Prairie Natural Regions of Texas.

The site encompassed approximately 110 acres and formerly included a 42-acre evaporation system, a 12-acre lagoon, a 17-acre dike surrounding the former lagoon, and miscellaneous processing equipment. The current site is a 32-acre capped vault completed with the OU1 remediation.

1.3 Operable Unit 2 History

In the final closure plan submitted to the state by SDS, the Sheridan Disposal Services Superfund Site was considered one unit. It was not until the U.S. EPA was involved with the site that 2 operable units were established. The Source Control unit was designated OU1 and the Ground Water Migration Management unit was designated OU2.

The ROD for OU2 was signed by U.S. EPA on September 27, 1989. The 1989 ROD identified natural attenuation as the selected remedy. The Ground Water Migration Management Consent Decree, ROD and Statement of Work were lodged in federal court in December 1991, but were not entered until October 22, 1997. The beginning of remedial action for OU2 was predicated on the completion of the remedial action for OU1 based on the assumption that without the source (sludge) available, the groundwater should be cleaned by natural attenuation from biological activity, sorption and filtration.

1.4 Operable Unit 2 Remedy

The major components of the selected remedy for Sheridan OU2 include:

- Natural attenuation of the groundwater;
- Monitoring of groundwater to ensure that the alternate concentration limits (ACL) are not exceeded;
- Sampling and analysis of the Brazos River immediately downgradient and upgradient of the point of entry of groundwater from the site to the river; and

- Development of a corrective action plan to ensure that protective levels are met at the point of potential exposure if the ACLs are exceeded.

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Section 2

2.0 ASSESSMENT MONITORING PROGRAM

2.1 Record of Decision Requirements

U.S. EPA has selected ACLs that are the appropriate groundwater standards for the site as long as the conditions set forth below remain valid. ACLs are groundwater protection standards that are used to assure that hazardous constituents found in the groundwater do not pose a risk to human health or the environment. To ensure that the ACLs remain protective, the following conditions must continue to be met at the site:

1) The Brazos River must remain the discharge point for groundwater from the site.

2) The Brazos River cannot be adversely impacted by the discharge of contaminated groundwater into the river. To ensure that future adverse impacts from the site do not occur at the point of exposure for environmental receptors in the river, the trigger levels specified in Section 4.2.1 of the Ground Water Migration Management Work Plan will be used as criteria to determine if surface water sampling should be resumed.

3) The groundwater use restrictions must be implemented and continued to ensure that affected groundwater is not consumed and the integrity of the Brazos River as a hydraulic barrier to groundwater flow is maintained. Groundwater restrictions specified in the ROD and Consent Decree include: no groundwater use within 100 feet from the edge of the plume and the owner will take no action at the site without getting consent from EPA, including sale of the site.

2.2 Remedy Assessment Criteria

Natural attenuation was chosen as the final remedy for groundwater. As part of the remedy selection process, ACLs were established for the groundwater protection standard. The ACL values were calculated by determining the volume of affected water entering the river at any time and factoring in the dilution which would occur in the river at historical low flow conditions.

In May 2011, the established ACLs were reviewed and revised as a result of EPA's first five-year review of the site. The revised ACLs are presented below.

COMPOUND	ALTERNATE CONCENTRATION LIMITS (mg/l)
Benzene	26
Tetrachloroethylene (PCE)	26
Trans-1,2-Dichloroethylene	520
Trichloroethylene (TCE)	26
Arsenic	52

The point of compliance for meeting the ACLs is the location where the ACLs must be met and is also the well location where ACLs are monitored. At the point of compliance, ACLs ensure that human health and the environment are protected at the point of exposure and no statistically significant increase in contamination occurs in the river.

SECTION THREE

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3.0 SAMPLING AND ANALYSIS PROCEDURES

3.1 Pre-Sampling Activities

Prior to the start of groundwater sampling, the existing monitoring wells, MW-6, MW-31, MW-34, MW-35, MW-37, and MW-39, were located in the field and the total depth of the monitoring well and the depth to groundwater in each monitoring well were measured.

3.2 Groundwater Sampling

Groundwater sampling for the constituents of concern was used to determine the presence and concentration of the constituents, and if ACLs were approached or exceeded. The measurement of water levels at the site was used to determine the groundwater flow direction and gradient to ensure that the Brazos River is the receptor of groundwater from the site.

3.2.1 Sampling Procedures

Groundwater samples were collected from each monitoring well using low flow sampling techniques to minimize the effects of sediment entrained in the sample during analysis. The methods described in the U.S. EPA guidance document titled "Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures" by Puls & Barcelona (EPA/540/S-95/504) were followed as described in the following paragraphs.

A variable flow submersible pump intake was placed at the middle, or slightly above the middle, of the screened interval and a low flow rate was used to draw formation water through the screen and up to the tubing outport. The flow rate was on the order of 0.1 - 0.5 L/min to minimize stress (drawdown of the water in the well casing), thereby minimizing any potential for overlying and underlying stagnant water to enter the pump intake. An in-line flow through cell was attached to the outport which allowed for a continual read-out of water quality parameters (i.e. pH, specific conductivity, temperature, dissolved oxygen, and oxidation reduction potential). Once these parameters had stabilized (indicative of formation water), the well was sampled regardless of the volume of water purged. Turbidity was also measured with intermittent samples using a HACH meter not attached to the flow through cell. Well purging operations during the sampling event were conducted with a YSI Water Quality Meter equipped with a flow through cell. All readings were recorded in the field logbook.

Upon the completion of sampling, the sample containers were labeled and placed on ice in laboratory supplied ice chests. The samples were shipped to the analytical laboratory at the completion of sampling with the proper chain-of-custody forms using an overnight delivery service. In addition to the groundwater samples, a quality control sample consisting of one duplicate was also collected during the sampling event.

3.2.2 Analytical Methods

Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, and metals. The VOC analysis was performed using EPA SW-846 Method 8260B, SVOC analysis by EPA SW-846 8270C, pesticides by EPA SW-846 8081A, and PCBs by EPA SW-846 8082. Samples for metals analysis were filtered with a 0.45 micron filter and submitted for analysis by EPA SW-846 6020/7470A. The specific constituents of concern included the following:

VOLATILE ORGANIC COMPOUNDS		
Acetone	Chloroform	4-Methyl-2-pentanone (MIBK)
Benzene	Chloromethane	Styrene
Bromodichloromethane	1,1-Dichloroethane	1,1,2,2-Tetrachloroethane
Bromoform	1,1-Dichloroethene	Tetrachloroethene
Bromomethane	trans-1,2-Dichloroethene	Toluene
2-Butanone (MEK)	1,2-Dichloropropane	1,1,1-Trichloroethane
Carbon disulfide	cis-1,3-Dichloropropene	1,1,2-Trichloroethane
Carbon tetrachloride	trans-1,3-Dichloropropene	Trichloroethene
Chlorodibromomethane	Ethylbenzene	Vinyl acetate
Chlorobenzene	2-Hexanone	Vinyl chloride
Chloroethane	Methylene chloride	Xylenes

PESTICIDES/PCBS		
Aldrin	Dieldrin	Aroclor 1242
alpha-BHC	Endosulfan I	Aroclor 1254
Beta-BHC	Endosulfan II	Aroclor 1221
delta-BHC	Endosulfan sulfate	Aroclor 1232
gamma-BHC (Lindane)	Endrin	Aroclor 1248
Chlordane	Endrin ketone	Aroclor 1260
4,4'-DDT	Heptachlor	Aroclor 1216
4,4'-DDE	Heptachlor epoxide	Toxaphene
4,4'-DDD	Methoxychlor	

METALS		
Arsenic	Chromium	Selenium
Barium	Lead	Silver
Cadmium	Mercury	Zinc
	Nickel	

SEMIVOLATILE ORGANIC COMPOUNDS		
Acenaphthene	m-Cresol	Hexachloroethane
Acenaphthylene	p-Cresol	Indeno(1,2,3-cd) pyrene
Anthracene	Di-n-butylphthalate	2-Methylnaphthalene
Benz(a)anthracene	Dibenz (a,h) anthracene	Naphthalene
Benzo(b)fluoranthene	1,2-Dichlorobenzene	2-Nitroaniline
Benzo(k)fluoranthene	1,3-Dichlorobenzene	3-Nitroaniline
Benzo(g,h,i)perylene	1,4-Dichlorobenzene	4-Nitroaniline
Benzo(a)pyrene	3,3'-Dichlorobenzidine	Nitrobenzene
Benzoic acid	2,4-Dichlorophenol	2-Nitrophenol
Benzyl alcohol	Diethyl phthalate	4-Nitrophenol
Bis(2-chloroethoxy) methane	2,4-Dimethylphenol	N-Nitrosodimethylamine
Bis(2-chloroehyl) ehter	Dimethylphthalate	N-Nitrosodiphenylamine
Bis(2-chloroisopropyl) ether	4,6-Dinitro-2-methylphenol	N-Nitrosodi-n-propylamine
Bis(2-ethylhexyl) phthalate	2,4-Dinitrophenol	Pentachlorophenol
4-Bromophenyl phenyl ether	2,4-Dinitrotoluene	Phenanthrene
Butyl benzyl phthalate	2,6-Dinitrotoluene	Phenol
p-Chloroaniline	Di-n-octylphthalate	Pyrene
p-Chloro-m-cresol	Fluoranthene	1,2,4-Trichlorobenzene
2-Chloronaphthalene	Fluorene	2,4,5-Trichlorophenol
2-Chlorophenol	Hexachlorobenzene	2,4,6-Trichlorophenol
4-Chlorophenyl phenyl ether	Hexachlorobutadiene	
Chrysene	Hexachlorocyclopentadiene	

3.3 Surface Water Sampling

In September 2007, SST requested revising the Ground Water Migration Management Workplan to forgo surface water sampling in the Brazos River as long as the analytical results from the monitoring wells remain below the ACL level specified in the ROD and Statement of Work for the Ground Water Migration Management Operable Unit 2. This request was based on the results of the past quarterly surface water sampling, which showed that only arsenic had been detected and those concentration levels had been more than five orders of magnitude below the ACL level. This request was approved on November 14, 2007 with one modification: the trigger levels specified in Section 4.2.1 of the Ground Water Migration Management Work Plan will be used as the criteria to determine if surface water sampling is resumed. If any groundwater sample results show significant increase in contaminant concentrations, resumption of surface water sampling will be evaluated.

SECTION FOUR

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4.0 EVALUATION OF MONITORING DATA

4.1 Analytical Results

The cumulative groundwater monitoring results are presented in Table 1. Data for constituents detected below reporting limits and qualified as estimated ("J") and constituents detected in the blank samples (B) were excluded from further evaluation. The laboratory analytical report is included in Appendix A. As shown in Table 1, concentrations of benzene, tetrachloroethylene, trans-1,2-dichloroethylene, trichloroethylene, and arsenic are either non-detect or well below the established ACLs. Additional constituents of potential concern that are being tracked include the following:

- Toluene was again not detected above the reporting limit or method detection limit in monitoring well MW-37 as during previous monitoring events. Historically, toluene was detected above the reporting limit on 5 of the 7 sampling events between 2007 and 2009 with a high concentration of 0.011 mg/l in May 2007. Other lower concentrations above reporting limits and method detection limits are included in Table 1.

- Chlorobenzene was detected above the method detection limit, but below the reporting limit in monitoring well MW-37. Historically, chlorobenzene was detected above the reporting limit on 8 of the 12 sampling events between 2007 and 2013 with a high concentration of 0.023 mg/l in December 2009. Other lower concentrations above reporting limits and method detection limits are included in Table 1. Chlorobenzene was also detected above the method detection limit, but below the reporting limit in monitoring well MW-34, consistent with historic concentrations.

- Vinyl chloride was detected above the reporting limit in monitoring well MW-37 at a concentration of 0.04 mg/l. The greatest concentration at which this constituent had previously been detected was 0.15 mg/l in May 2008. Vinyl chloride was also detected above the reporting limit in monitoring well MW-34 at a concentration of 0.0018 mg/l. The greatest concentration at which this constituent had previously been detected was 0.0031 mg/l in December 2010. Vinyl chloride was also detected above the reporting limit in monitoring well MW-6 at a concentration of 0.0021 mg/l. The highest concentration at which this constituent had previously been detected was 0.0041 mg/l in December 2010. Other concentrations above reporting limits and method detection limits for these monitoring wells are included in Table 1. It is highly probable that the vinyl chloride now being detected is a degradation product of both TCE and PCE, which demonstrates that the selected remedy of natural attenuation is ongoing at the Site.

With regard to a comparison of the June 2014 sampling results to the analytical results for the previous sampling events conducted since 1987, as shown in Figures 2A through 2F, the following conclusions can be drawn:

- Constituent concentrations in the groundwater collected from monitoring wells MW-6, MW-31, MW-35, and MW-39 generally appear stable with an overall reduction from the 1987 detected values. While the laboratory detection limits for the constituents of concern have become lower over the sampling period, the constituents detected are generally within the same order of magnitude.

- Benzene concentrations in groundwater collected from monitoring well MW-34 have generally remained within the same order of magnitude since the December 2009 sampling event (see Figure 2C). This is consistent with the results from other previous sampling events and may indicate that the concentration detected in May 2009 is anomalous.

- With the exception of one anomalous concentration in December 2009, trichloroethene concentrations in groundwater collected from monitoring well MW-37 have consistently been within 1 to 2 orders of magnitude (see Figure 2E). These concentrations are significantly below the established ACLs.

4.2 Groundwater Gradient

The groundwater gradient and flow direction for the site were determined using the groundwater elevation data collected from the monitoring wells during the sampling events. These data are included in Table 2 and are depicted on Figure 1. Based on the data collected during the sampling event, the groundwater flow direction is to the northeast towards the Brazos River, as it has historically been.

4.3 Further Action

The concentrations of the constituents of concern in groundwater did not exceed the established trigger levels for increased monitoring, as presented below.

TRIGGER LEVELS FOR INCREASED FREQUENCY OF GROUNDWATER MONITORING	
COMPOUND	**TRIGGER LEVEL (mg/L)**
Benzene	1
Tetrachloroethylene	2
Trans-1,2-Dichloroethylene	1
Trichloroethylene	1
Arsenic	10

Therefore, based on the results from the June 2014 and previous sampling events, no further action with respect to an increase in the monitoring frequency is required in accordance with the Ground Water Migration Management Work Plan (as revised).

SECTION FIVE

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5.0 REFERENCES

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Tables

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TABLE 1
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
LABORATORY ANALYTICAL RESULTS

Monitoring Well ID No.	Sample Date	Benzene (mg/l)	PCE (mg/l)	trans-1,2-DCE (mg/l)	TCE (mg/l)	Arsenic (mg/l)	Vinyl Chloride (mg/l)	Toluene (mg/l)	Chloro-benzene (mg/l)
Alternate Concentration Limit		**26**	**26**	**520**	**26**	**52**			
Trigger for RAP Preparation		**4**	**6**	**4**	**4**	**40**			
Trigger for Increased Monitoring		**1**	**2**	**1**	**1**	**10**			
MW-6	10/27/87	<0.005	<0.005	<0.005	<0.005	0.007			
	08/03/06	<0.0002	<0.0002	<0.0002	<0.00032	0.0014J	0.00073J	<0.0002	<0.0002
	11/08/06	<0.0002	<0.0002	<0.0002	<0.00032	0.0017J	0.0016J	<0.0002	<0.0002
	02/21/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0017J	0.0027J	<0.0002	<0.0002
	05/24/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0018J	0.0032J	<0.0002	<0.0002
	11/28/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0002J	0.0046J	<0.0002	<0.0002
	05/28/08	<0.0002	<0.0002	<0.0002	<0.00032	<0.002	0.0013J	<0.0002	<0.0002
	11/19/08	<0.0002	<0.0002	<0.0002	<0.00032	0.0023J	0.0010	<0.0002	<0.0002
	05/27/09	<0.0002	<0.0002	<0.0002	<0.00032	0.0024J	0.0011	<0.0002	<0.0002
	12/01/09	<0.0002	<0.0002	<0.0002	<0.00032	<0.0015	0.0019	<0.0002	<0.0002
	05/26/10	<0.0002	<0.0002	<0.0002	<0.00032	<0.0015	<0.0002	<0.0002	<0.0002
	12/02/10	<0.0002	<0.0002	<0.0002	<0.00032	0.0014J	0.0041	<0.0002	<0.0002
	05/26/11	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	0.0025	<0.0003	<0.00014
	06/06/12	<0.00014	<0.00019	<0.0002	<0.00032	0.0014J	0.0024	<0.0003	<0.00014
	06/05/13	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0003	<0.00014
	06/11/14	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	0.0021	<0.0005	<0.00014
MW-31	10/28/87	<0.005	<0.005	<0.005	<0.005	0.006			
	08/03/06	<0.0002	<0.0002	<0.0002	<0.00032	0.0023	<0.0002	<0.0002	<0.0002
	11/08/06	<0.0002	<0.0002	<0.0002	<0.00032	0.012	<0.0002	<0.0002	<0.0002
	02/21/07	<0.0002	<0.0002	<0.0002	<0.00032	0.011	<0.0002	<0.0002	<0.0002
	05/24/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0076	<0.0002	<0.0002	<0.0002
	11/28/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0021J	<0.0002	<0.0002	<0.0002
	05/28/08	<0.0002	<0.0002	<0.0002	<0.00032	0.015	<0.0002	<0.0002	<0.0002
	11/19/08	<0.0002	<0.0002	<0.0002	<0.00032	0.014	<0.0002	<0.0002	<0.0002
	05/27/09	<0.0002	<0.0002	<0.0002	<0.00032	0.015	<0.0002	<0.0002	<0.0002
	12/01/09	<0.0002	<0.0002	<0.0002	<0.00032	0.01	<0.0002	<0.0002	<0.0002
	05/26/10	<0.0002	<0.0002	<0.0002	<0.00032	0.02	<0.0002	<0.0002	<0.0002
	12/02/10	<0.0002	<0.0002	<0.0002	<0.00032	0.013	<0.0002	<0.0002	<0.0002
	05/26/11	<0.00014	<0.00019	<0.0002	<0.00032	0.012	<0.0003	<0.0003	<0.00014
	06/06/12	<0.00014	<0.00019	<0.0002	<0.00032	0.018	<0.0003	<0.0003	<0.00014
	06/05/13	<0.00014	<0.00019	<0.0002	<0.00032	0.016	<0.0003	<0.0003	<0.00014
	06/11/14	<0.00014	<0.00019	<0.0002	<0.00032	0.015	<0.0003	<0.0005	<0.00014
MW-34	10/29/87	0.027	<0.005	0.025	0.0150	<0.003			
	08/03/06	0.067	<0.0002	0.012	0.00044J	0.0058	0.0017J	0.00023J	0.00052J
	11/08/06	0.0088	<0.0002	0.0044J	0.0004J	0.0044J	0.00067J	<0.0002	0.00029J
	02/21/07	0.010	<0.0002	0.0081	0.00036J	0.0038J	0.0013J	0.0002J	0.00027J
	05/24/07	0.00039J	<0.0002	0.0013J	<0.00032	<0.001	0.00031J	<0.0002	<0.0002
	11/28/07	0.0047J	<0.0002	0.004J	0.0012J	0.0042J	0.00063J	<0.0002	0.00029J
	05/28/08	0.0014J	<0.0002	0.0042J	<0.00032	0.0032J	0.0012J	<0.0002	<0.0002
	11/19/08	0.0032	<0.0002	0.0084	0.00035J	0.0068	0.0023	<0.0002	0.00042J
	05/27/09	0.100	<0.0002	0.015	0.00094J	0.0066	0.0017	0.00025J	0.0013
	12/02/09	0.0094	<0.0002	0.0034	<0.00032	0.0029J	0.0013	<0.0002	0.00024J
	05/26/10	0.0042	<0.0002	0.0047	<0.00032	0.0017J	0.0011	<0.0002	0.00033J
	12/03/10	0.0091	<0.0002	0.012	0.0005J	0.0045J	0.0031	<0.0002	<0.0002
	05/26/11	0.0033	<0.00019	0.0086	<0.00032	0.0063	0.0011	<0.0003	<0.00014
	06/06/12	0.0025	<0.00019	0.0051	<0.00032	0.0045J	0.0016	<0.0003	<0.00014
	06/06/13	0.01	<0.00019	0.0064	<0.00032	0.0067	0.0016	<0.0003	0.00059J
	06/11/14	0.0007 J	<0.00019	0.0058	<0.00032	0.003 J	0.0018	<0.0005	0.00024 J
MW-35	10/29/87	<0.005	<0.005	<0.005	<0.005	<0.003			
	08/03/06	0.00033J	<0.0002	<0.0002	<0.00032	<0.001	<0.0002	<0.0002	<0.0002
	11/08/06	<0.0002	<0.0002	<0.0002	<0.00032	<0.001	<0.0002	<0.0002	<0.0002

J: Result is < RL, but > or = to MDL and concentration is estimated

TABLE 1
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
LABORATORY ANALYTICAL RESULTS

Monitoring Well ID No.		Sample Date	Benzene (mg/l)	PCE (mg/l)	trans-1,2-DCE (mg/l)	TCE (mg/l)	Arsenic (mg/l)	Vinyl Chloride (mg/l)	Toluene (mg/l)	Chloro-benzene (mg/l)
Alternate Concentration Limit			**26**	**26**	**520**	**26**	**52**			
Trigger for RAP Preparation			**4**	**6**	**4**	**4**	**40**			
Trigger for Increased Monitoring			**1**	**2**	**1**	**1**	**10**			
MW-35		02/21/07	<0.0002	<0.0002	<0.0002	<0.00032	<0.001	<0.0002	<0.0002	<0.0002
		05/24/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0015J	<0.0002	<0.0002	<0.0002
		11/28/07	<0.0002	<0.0002	<0.0002	<0.00032	<0.002	<0.0002	<0.0002	<0.0002
		05/28/08	<0.0002	<0.0002	<0.0002	<0.00032	<0.002	<0.0002	<0.0002	<0.0002
		11/19/08	<0.0002	<0.0002	<0.0002	<0.00032	<0.0011	<0.0002	<0.0002	<0.0002
		05/27/09	<0.0002	<0.0002	<0.0002	<0.00032	0.0013J	<0.0002	<0.0002	<0.0002
		12/02/09	<0.0002	<0.0002	<0.0002	<0.00032	<0.0015	<0.0002	<0.0002	<0.0002
		05/26/10	<0.0002	<0.0002	<0.0002	<0.00032	<0.0015	<0.0002	<0.0002	<0.0002
		12/02/10	<0.0002	<0.0002	<0.0002	<0.00032	<0.0011	<0.0002	<0.0002	<0.0002
		05/26/11	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0003	<0.00014
		06/07/12	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0003	<0.00014
		06/06/13	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0003	<0.00014
		06/11/14	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0005	<0.00014
MW-37		10/29/87	<0.005	0.013	0.0052	<0.005	<0.003			
		08/03/06	0.0013J	<0.0002	0.0046J	0.00032J	0.004J	0.011	0.00047J	0.0015J
		11/08/06	0.00076J	0.00074J	0.0029J	0.0013J	0.0033J	0.0068	0.00022J	0.0014J
		02/21/07	0.011	0.0012J	0.011	0.004J	0.0074	0.055	0.0089	0.0047J
		05/24/07	0.018	0.014	0.02	0.056	0.0073	0.076	0.011	0.012
		11/28/07	0.0026J	0.022	0.006	0.026	0.0021J	0.0072	0.00025J	0.0019J
		05/28/08	0.016	<0.0002	0.017	0.0019J	0.0061	0.15	0.0067	0.0087
		11/19/08	0.0035	0.00068J	0.0045	0.0017	0.0048J	0.072	0.0005J	0.0031
		05/27/09	0.0027	0.00076J	0.0023	0.0035	0.0036J	0.011	0.0011	0.0026
		12/02/09	0.022	0.14	0.073	0.45	0.0041J	0.092	0.0029	0.023
		05/26/10	0.0052	0.014	0.012	0.054	0.004J	0.028	0.0006J	0.0056
		12/03/10	0.0014	0.0013	0.003	0.0075	0.0024J	0.061	0.00021J	0.0016
		05/27/11	0.0023	0.0014	0.0014	0.01	0.0017J	0.038	<0.0003	<0.00014
		06/07/12	0.0017	0.0083	0.011	0.045	0.004J	0.012	<0.0003	<0.00014
		06/06/13	0.0019	0.0012	0.011	0.012	0.0031J	0.13	<0.0003	0.0017
		06/11/14	0.00047 J	0.00069 J	0.0017	0.0032	0.0015 J	0.04	<0.0005	0.00062 J
MW-39		10/28/87	<0.005	<0.005	<0.005	<0.005	0.048			
		08/03/06	<0.0002	<0.0002	<0.0002	<0.00032	0.051	<0.0002	<0.0002	<0.0002
		11/08/06	<0.0002	<0.0002	<0.0002	<0.00032	0.0033J	<0.0002	<0.0002	<0.0002
		02/21/07	<0.0002	<0.0002	<0.0002	<0.00032	0.003J	<0.0002	<0.0002	<0.0002
		05/24/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0056	<0.0002	<0.0002	<0.0002
		11/28/07	<0.0002	<0.0002	<0.0002	<0.00032	0.0029J	<0.0002	<0.0002	<0.0002
		05/28/08	<0.0002	<0.0002	<0.0002	<0.00032	0.0068	<0.0002	<0.0002	<0.0002
		11/19/08	<0.0002	<0.0002	<0.0002	<0.00032	0.0065	<0.0002	<0.0002	<0.0002
		05/27/09	<0.0002	<0.0002	<0.0002	<0.00032	0.007	<0.0002	<0.0002	<0.0002
		12/02/09	<0.0002	<0.0002	<0.0002	<0.00032	0.0052	<0.0002	<0.0002	<0.0002
		05/26/10	<0.0002	<0.0002	<0.0002	<0.00032	0.004J	<0.0002	<0.0002	<0.0002
		12/03/10	<0.0002	<0.0002	<0.0002	<0.00032	0.0081	<0.0002	<0.0002	<0.0002
		05/26/11	<0.00014	<0.00019	<0.0002	<0.00032	0.0022J	<0.0003	<0.0003	<0.00014
		06/06/12	<0.00014	<0.00019	<0.0002	<0.00032	0.011	<0.0003	<0.0003	<0.00014
		06/05/13	<0.00014	<0.00019	<0.0002	<0.00032	0.01	<0.0003	<0.0003	<0.00014
		06/11/14	<0.00014	<0.00019	<0.0002	<0.00032	0.0068	<0.0003	<0.0005	<0.00014
Duplicate	MW-31	11/19/08	<0.0002	<0.0002	<0.0002	<0.00032	0.014	<0.0002	<0.0002	<0.0002
	MW-31	05/27/09	<0.0002	<0.0002	<0.0002	<0.00032	0.016	<0.0002	<0.0002	<0.0002
	MW-31	12/01/09	<0.0002	<0.0002	<0.0002	<0.00032	0.01	<0.0002	<0.0002	<0.0002
	MW-37	05/26/10	0.0059	0.013	0.013	0.056	0.0037J	0.03	0.00086J	0.0066
	MW-35	12/02/10	<0.0002	<0.0002	<0.0002	<0.00032	<0.0011	<0.0002	<0.0002	<0.0002
	MW-31	05/26/11	<0.00014	<0.00019	<0.0002	<0.00032	0.011	<0.0003	<0.0003	<0.00014

J: Result is < RL, but > or = to MDL and concentration is estimated

TABLE 1
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
LABORATORY ANALYTICAL RESULTS

Monitoring Well ID No.		Sample Date	Benzene (mg/l)	PCE (mg/l)	trans-1,2-DCE (mg/l)	TCE (mg/l)	Arsenic (mg/l)	Vinyl Chloride (mg/l)	Toluene (mg/l)	Chloro-benzene (mg/l)
Alternate Concentration Limit			**26**	**26**	**520**	**26**	**52**			
Trigger for RAP Preparation			**4**	**6**	**4**	**4**	**40**			
Trigger for Increased Monitoring			**1**	**2**	**1**	**1**	**10**			
Duplicate	MW-35	06/07/12	<0.00014	<0.00019	<0.0002	<0.00032	<0.0011	<0.0003	<0.0003	<0.00014
	MW-31	06/05/13	<0.00014	<0.00019	<0.0002	<0.00032	0.013	<0.0003	<0.0003	<0.00014
	MW-31	06/11/14	<0.00014	<0.00019	<0.0002	<0.00032	0.014	<0.0003	<0.0005	<0.00014

J: Result is < RL, but > or = to MDL and concentration is estimated

TABLE 2
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
WELL DATA

Monitoring Well ID No.	Sample Date	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Standpipe Stickup (+) Stickdown (-)	Total Well Depth (ft from gs)	Casing/ Screen Diameter (inches)	Screened Interval (ft from gs)	Depth to Water (ft from gs)	Depth to Water (ft from TOC)	Water Elevation (ft amsl)
MW-6	08/03/06	164.46	167.58	3.12	95.21	2	80-95	33.41	36.53	131.05
	11/08/06							33.12	36.24	131.34
	02/21/07							27.76	30.88	136.70
	05/24/07							28.16	31.28	136.30
	11/28/07							27.25	30.37	137.21
	05/28/08							28.41	31.53	136.05
	11/19/08							31.20	34.32	133.26
	05/27/09							31.10	34.22	133.36
	12/01/09							31.00	34.12	133.46
	05/26/10							30.00	33.12	134.46
	12/02/10							32.46	35.58	132.00
	05/26/11							34.50	37.62	129.96
	06/06/12							33.16	36.28	131.30
	06/06/13							36.37	39.49	128.09
	06/11/14							33.48	36.60	130.98
MW-31	08/03/06	166.70	168.67	1.97	65.01	4	25-60	35.34	37.31	131.36
	11/08/06							35.26	37.23	131.44
	02/21/07							32.65	34.62	134.05
	05/24/07							29.07	31.04	137.63
	11/28/07							27.77	29.74	138.93
	05/28/08							30.24	32.21	136.46
	11/19/08							33.43	35.40	133.27
	05/27/09							32.56	34.53	134.14
	12/01/09							32.35	34.32	134.35
	05/26/10							29.45	31.42	137.25
	12/02/10							33.12	35.09	133.58
	05/26/11							35.64	37.61	131.06
	06/06/12							33.42	35.39	133.28
	06/06/13							37.46	39.43	129.24
	06/11/14							34.48	36.45	132.22
MW-34	08/03/06	171.07	173.45	2.38	65.50	4	26-61	42.78	45.16	128.29
	11/08/06							41.22	43.60	129.85

TABLE 2
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
WELL DATA

Monitoring Well ID No.	Sample Date	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Standpipe Stickup (+) Stickdown (-)	Total Well Depth (ft from gs)	Casing/ Screen Diameter (inches)	Screened Interval (ft from gs)	Depth to Water (ft from gs)	Depth to Water (ft from TOC)	Water Elevation (ft amsl)
MW-34	02/21/07	171.07	173.45	2.38	65.50	4	26-61	39.70	42.08	131.37
	05/24/07							33.66	36.04	137.41
	11/28/07							37.40	39.78	133.67
	05/28/08							36.05	38.43	135.02
	11/19/08							41.47	43.85	129.60
	05/27/09							39.99	42.37	131.08
	12/02/09							36.38	38.76	134.69
	05/26/10							36.27	38.65	134.80
	12/02/10							40.58	42.96	130.49
	05/26/11							42.78	45.16	128.29
	06/06/12							41.18	43.56	129.89
	06/06/13							43.38	45.76	127.69
	06/11/14							40.65	43.03	130.42
MW-35	08/03/06	171.32	173.39	2.07	105.02	2	80-100	41.44	43.51	129.88
	11/08/06							41.32	43.39	130.00
	02/21/07							39.32	41.39	132.00
	05/24/07							36.45	38.52	134.87
	11/28/07							34.57	36.64	136.75
	05/28/08							36.49	38.56	134.83
	11/19/08							40.19	42.26	131.13
	05/27/09							40.04	42.11	131.28
	12/02/09							38.09	40.16	133.23
	05/26/10							37.18	39.25	134.14
	12/02/10							40.25	42.32	131.07
	05/26/11							42.56	44.63	128.76
	06/07/12							40.79	42.86	130.53
	06/06/13							44.05	46.12	127.27
	06/11/14							41.95	44.02	129.37
MW-37	08/03/06	161.83	164.09	2.26	59.70	4	25-55	36.65	38.91	125.18
	11/08/06							35.35	37.61	126.48
	02/21/07							33.03	35.29	128.80
	05/24/07							27.18	29.44	134.65

TABLE 2
SHERIDAN DISPOSAL SERVICES SUPERFUND SITE
GROUND WATER OPERABLE UNIT 2
WELL DATA

Monitoring Well ID No.	Sample Date	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Standpipe Stickup (+) Stickdown (-)	Total Well Depth (ft from gs)	Casing/ Screen Diameter (inches)	Screened Interval (ft from gs)	Depth to Water (ft from gs)	Depth to Water (ft from TOC)	Water Elevation (ft amsl)
MW-37	11/28/07	161.83	164.09	2.26	59.70	4	25-55	32.20	34.46	129.63
	05/28/08							29.89	32.15	131.94
	11/19/08							35.66	37.92	126.17
	05/27/09							32.65	34.91	129.18
	12/02/09							30.48	32.74	131.35
	05/26/10							30.36	32.62	131.47
	12/02/10							35.03	37.29	126.80
	05/27/11							37.12	39.38	124.71
	06/07/12							35.38	37.64	126.45
	06/06/13							37.57	39.83	124.26
	06/11/14							34.24	36.50	127.59
MW-39	08/03/06	164.81	166.41	1.60	59.00	4	34-54	34.15	35.75	130.66
	11/08/06							32.85	34.45	131.96
	02/21/07							28.91	30.51	135.90
	05/24/07							25.56	27.16	139.25
	11/28/07							28.33	29.93	136.48
	05/28/08							27.07	28.67	137.74
	11/19/08							30.77	32.37	134.04
	05/27/09							29.54	31.14	135.27
	12/02/09							29.89	31.49	134.92
	05/26/10							28.00	29.60	136.81
	12/02/10							32.59	34.19	132.22
	05/26/11							34.74	36.34	130.07
	06/06/12							32.32	33.92	132.49
	06/06/13							35.96	37.56	128.85
	06/11/14							29.84	31.44	134.97

FIGURES

ENTACT®
environmental services

BRAZOS RIVER

MW-37
127.59

MW-35
129.37

MW-34
130.42

MW-31
132.22

MW-6
130.98

MW-39
134.97

128

129

130

131

132

133

134

FORMER
LAGOON
AREA

FORMER
EVAPORATION
SYSTEM
AREA

N

SCALE

0' 200' 400'

LEGEND

MW-6
131.30 — MONITOR WELL LOCATION AND TOP OF CASING ELEVATION

160 / 161 — REVISED CONTOURS - POST REMEDIATION

EXISTING CONTOURS

132 — GROUNDWATER GRADIENT CONTOUR

GROUNDWATER FLOW DIRECTION

* MW-6 AND MW-35 COMPLETED IN DEEPER AQUIFER

ENTACT
699 South Friendswood Drive, Suite 101
Friendswood, Texas 77546
P: 281-996-9892 F: 281-996-9888

SHERIDAN DISPOSAL SERVICES
SUPERFUND SITE
WALLER COUNTY, TEXAS

GROUNDWATER GRADIENT
AND
FLOW DIRECTION MAP

DESIGNED BY	G. TUNSTALL	01-23-06	CHECKED BY	J. SELF	06-20-14
DRAWN BY	M. AVILA	06-20-14	APPROVED BY	J. SELF	06-20-14

SCALE:	PROJECT NO.	DRAWING NO.	REVISION NO.
1" : 200'	E8077	1	

Figure 2A
MW-6

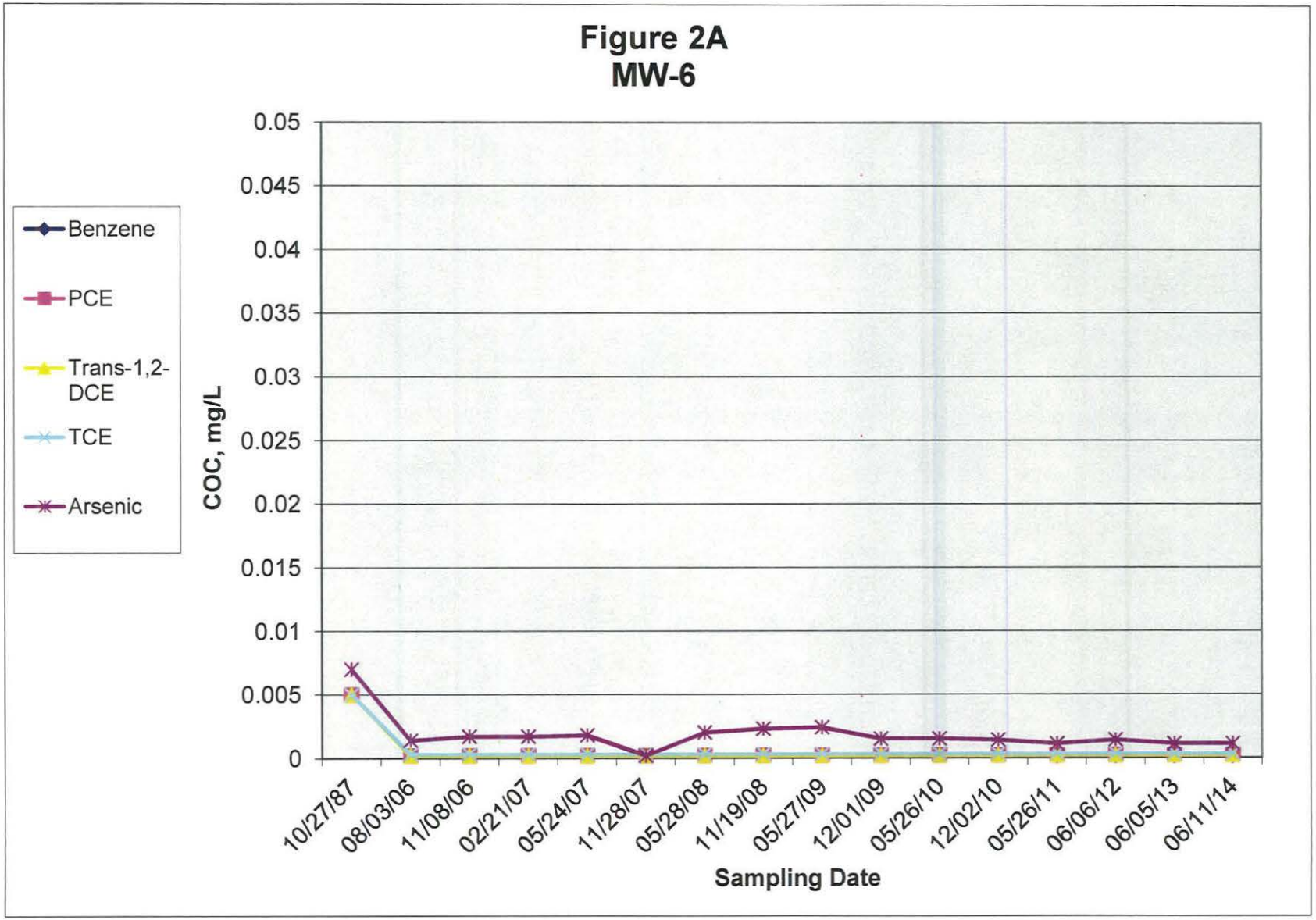

Figure 2B
MW-31

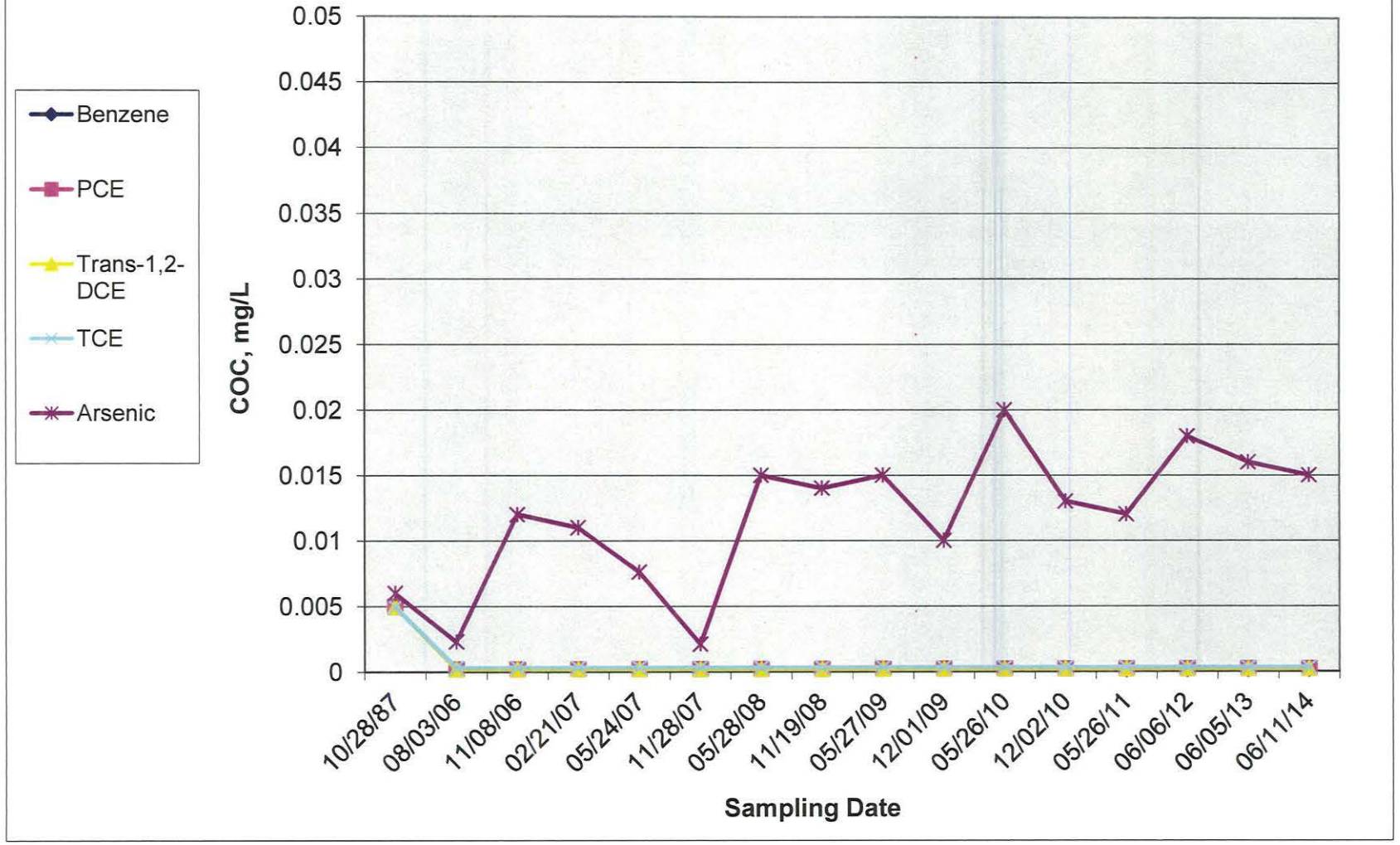

Figure 2C
MW-34

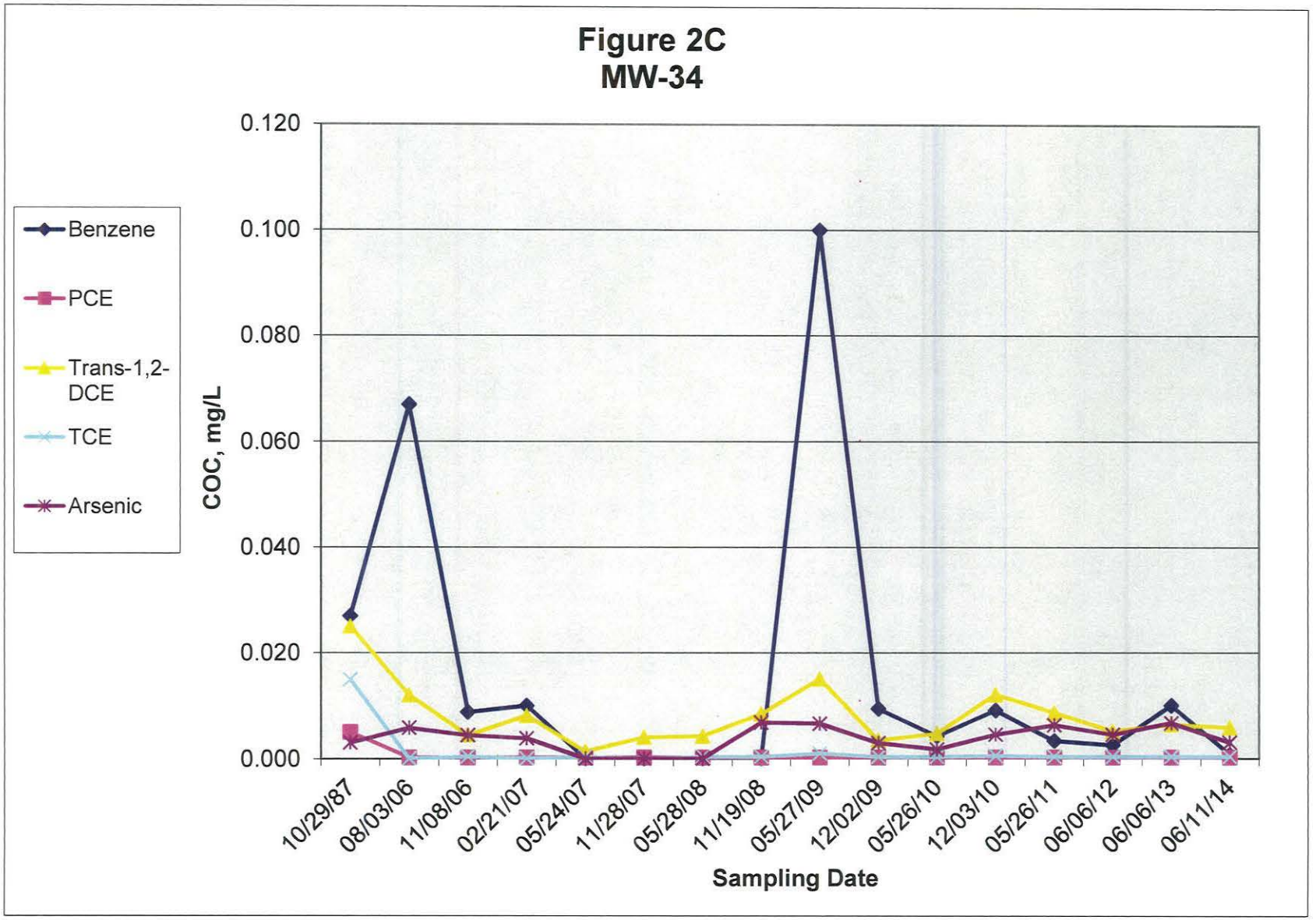

Figure 2D
MW-35

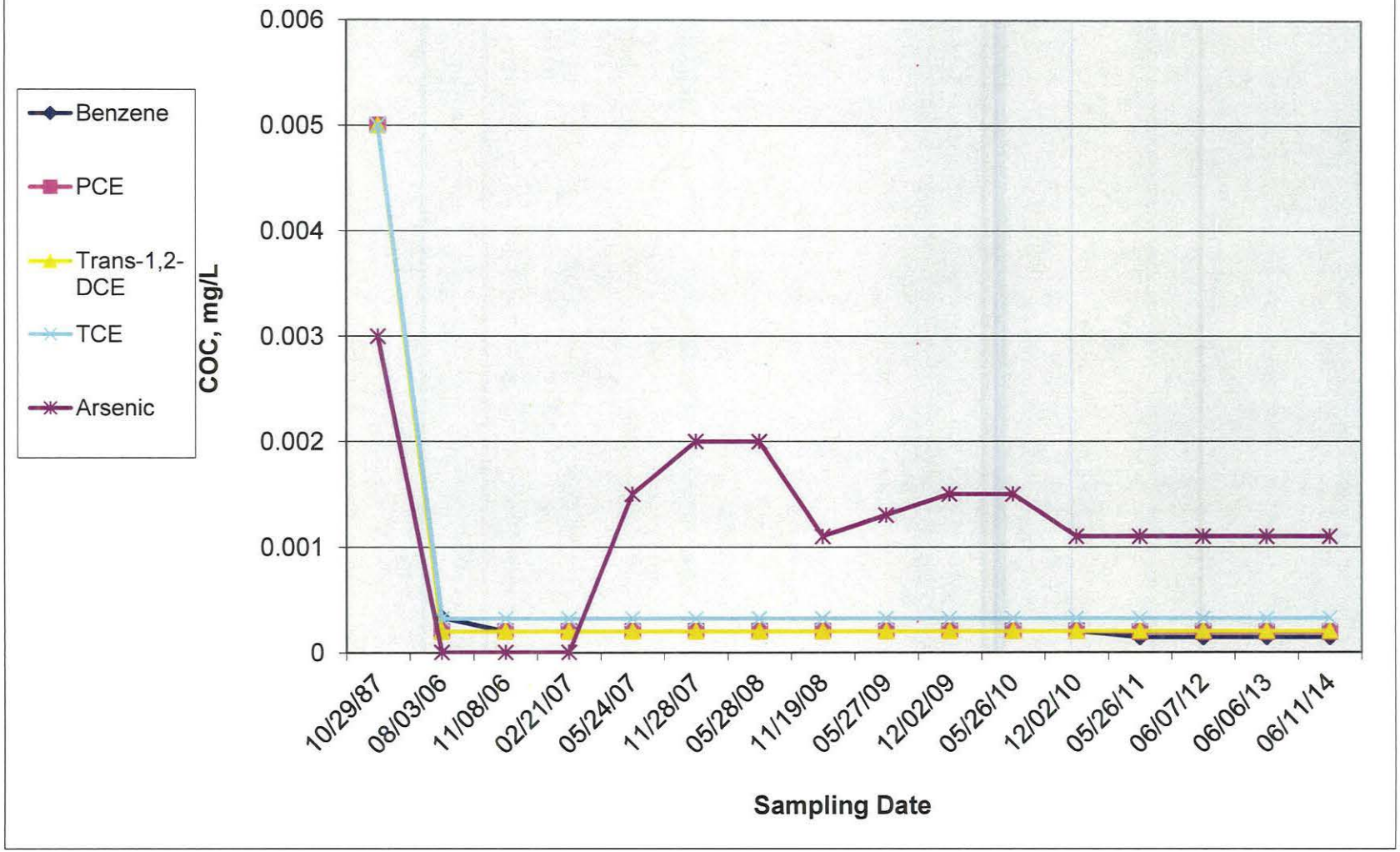

Figure 2E
MW-37

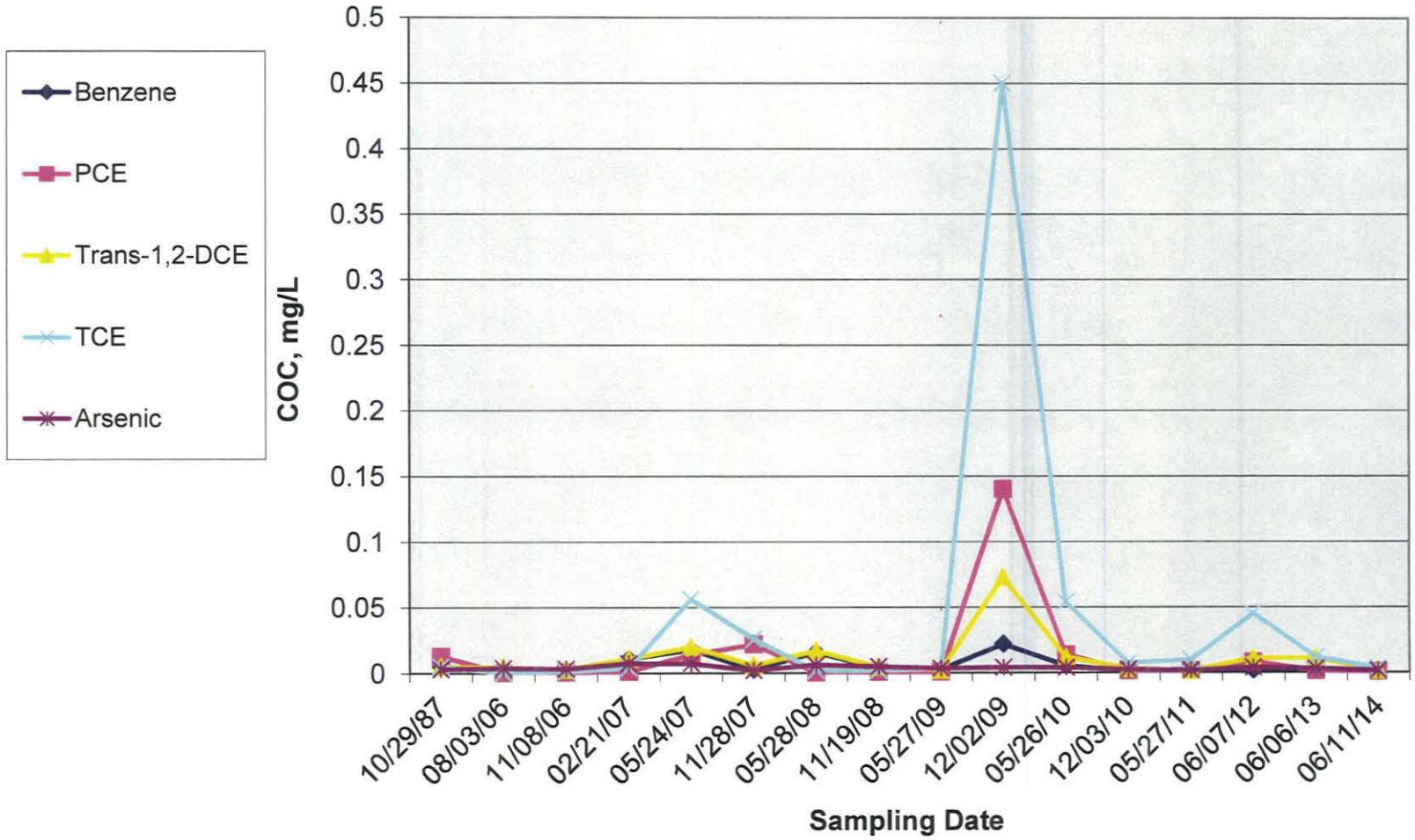

Figure 2F
MW-39